

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056**

In the matter of the petition of

Ilyushin Aviation Complex

for an exemption from 14 CFR § 25.1435(b)(1)

Regulatory Docket No. 29129

GRANT OF EXEMPTION

By letter of January 14, 1998, Mr. V. I. Terentyev, The Deputy General Designer, Ilyushin Aviation Complex, 45g, Leningradsky Prospekt, Moscow, 125190, Russia, petitioned for exemption from the static pressure test requirement of 14 CFR § 25.1435(b)(1), for the hydraulic system on the Ilyushin Model IL-96T airplane.

Section of the FAR affected:

Section 25.1435(b)(1) states that a complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate, and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure.

Related Section of the FAR:

Section 25.1435(a)(2) states that each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied by a factor of 1.5, in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure.

The petitioner's supportive information is as follows:

In lieu of a static test at 1.5 times operating pressure (315 atmospheres (atm), operating pressure is 210 atm), Ilyushin proposes to demonstrate compliance with FAR § 25.1435(b)(1) by conducting a combination of the following tests: “(i) [Test] of the complete hydraulic system at relief valve opening pressure ± 5 atm, where relief valve opening pressure = 240 atm; (ii) [Test] of the hydraulic system components at 1.5 times operating pressure (315 atm) in accordance with FAR § 25.1435(a)(2); and (iii) [Test] of the complete hydraulic system during flight and ground tests (at operating pressure).”

Ilyushin states: “Granting of this exemption with respect to testing a complete hydraulic system at 1.5 times operating pressure (315 atm) is in the public interest because Ilyushin’s proposed method of demonstrating compliance will provide greater assurance of airplane safety than that required by FAR § 25.1435(b)(1).”

Ilyushin continues: “The 315 atm pressure test requires all relief valves disabled (including built-in ones), and disconnecting all flight control packages and retract and extend of landing gear control cylinders. The hydraulic system with these modifications will not comply entirely with the FAR § 25.1435(b)(1) requirements because disconnected parts of the hydraulic system will not be tested.

“The proposed test method (240 \pm 5 atm) would be a better test because at such conditions all transients in the hydraulic system are reproduced and all hydraulic system elements will operate at normal condition.

“The more reliable check is provided under such conditions for the following:

- external leakage of the fluid;
- permanent deformations;
- clearances between the airplane structure and hydraulic system elements for its proper operation.

“Static tests of each hydraulic system element at 315 atm pressure will be performed independently during qualification tests in accordance with FAR § 25.1435(a)(2).”

Ilyushin further states: “The proposed test method provides more assurance of airplane safety because:

- considerable number of packages would not be deactivated (including with built-in relief valves and those which control retract and extend of landing gear, etc.);
- the transients are taken into account during the tests, which could not be performed during the static pressure tests at 1.5 operating pressure;
- movement of hoses and hydraulic lines under the pressure in conjunction with movement of moving elements (control surfaces, supports, doors, etc.) can be observed.”

Ilyushin continues: “The above approach proved to be true of the following:

- the service of IL-62, IL-76, IL-86,, and IL-96-300 airplanes with complete hydraulic systems had been tested at $210 \pm 10_7$ atm operating pressure. There were not defects produced by permanent deformations or lack of clearance between hydraulic system elements and the airplane structure.
- Boeing gained a similar exemption from FAR § 25.1435(b)(1) requirements (see Exemption N 5758A, Regulatory Docket N 27384).
- The conducting of these tests under the relief valve opening pressure will be provided in the draft of new edition of § 25.1435 (Docket 28617; Notice 96-6).”

In conclusion: “Ilyushin Aviation Complex asserts that its proposed method of pressure testing at 240 ± 5 atm pressure of the complete hydraulic system provides, in the public interest, greater assurance of safe operation in comparison with 315 atm static pressure tests defined in FAR § 25.1435(b)(1) and hereby petitions the FAA to grant the subject exemption.” Ilyushin notes that the Aviation Register (the Russian Aviation Authority), agrees with their proposals. Ilyushin requests that the FAA publish their petition for exemption in the Federal Register for public discussion.

A summary of the petition was published in the Federal Register on March 3, 1998 (63 FR 10425). No comments were received.

The FAA's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner, and has determined that there is sufficient merit to warrant a grant of exemption.

Notice of Proposed Rulemaking, 96-6

The FAA concurs that the petitioner’s proposed test is in compliance with the proposed rule change, Notice 96-6 and that a precedent does exist based on the partial exemption granted for the Boeing 777-200 (docket 27384).

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator (14 CFR 11.53), Ilyushin Aviation Complex is hereby granted an exemption from § 25.1435(b)(1) of the FAR to the extent necessary to permit type certification of the Model IL-96T by

conducting a test of the complete hydraulic system at 240 ± 5 atm (the system relief pressure), all hydraulic components testing at 1.5 times the operating pressure (315 atm) per the current § 25.1435(a)(2), and a test of the complete hydraulic system during flight and ground tests at operating pressure. All test results pertinent to this exemption must be documented in a report and a copy provided to this office.

Issued in Renton, Washington, on April 21, 1998.

/s/ Gary L. Killion

Gary L. Killion

Acting Manager, Transport Airplane Directorate
Aircraft Certification Service, ANM-100